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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,397	04/18/2001	Shuichi Kikuchi	10417-079001	7648

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FISH & RICHARDSON P.C.  
45 ROCKEFELLER PLAZA, SUITE 2800  
NEW YORK, NY 10111

EXAMINER
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LEWIS, MONICA

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 08/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/837,397

Applicant(s)

KIKUCHI ET AL.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 19 June 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. This office action is in response to the amendment filed June 19, 2003.

#### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-6 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Response to Amendment***

3. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as obvious over Hsing et al. (U.S. Patent No. 5,517,046) in view of Beasom (U.S. Patent No. 5,541,435) and Kuroi et al. (Japanese Patent No. 402280342).

In regards to claim 1, Hsing et al. ("Hsing") discloses the following:

a) a semiconductor substrate (20) of a first conductive type (For Example: See Figure 3);

b) a gate insulation film (24) disposed over the semiconductor substrate (For Example: See Figure 3);

c) a gate electrode (26) provided on the gate insulation film (See Figure 3);

d) a high concentration source region (32) of a second conductive type at one end of said gate electrode (For Example: See Figure 3);

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e) a low concentration drain region (22) of the second conductive type provided to face said source region through a channel region (For Example: See Figure 3);

f) a high concentration drain region (34) of the second conductive type spaced away from another end of said gate electrode and disposed in said low concentration drain region (For Example: See Figure 3); and

g) a middle concentration layer (31) of the second conductive type disposed in said low concentration drain region and disposed at least from a predetermined position spaced away from said gate electrode to said high concentration drain region (For Example: See Figure 3).

In regards to claim 1, Hsing fails to disclose the following:

a) source region disposed in the substrate.

However, Beasom discloses a source region disposed in the substrate (For Example: See Figure 10). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Hsing to include a source region disposed in the substrate as disclosed in Beasom because it aids in providing a device that can make modifications where high voltage conditions will be encountered (For Example: See Abstract and Column 2 Lines 10-31).

Additionally, since Hsing and Beasom are both from the same field of endeavor, the purpose disclosed by Beasom would have been recognized in the pertinent art of Hsing.

b) an impurity concentration of said middle concentration layer increases from said gate electrode to near said high concentration drain region.

However, Kuroi discloses an impurity concentration of said middle concentration layer increases from said gate electrode to near said high concentration drain region (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor

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device of Hsing to include an impurity concentration of a middle concentration layer that increases from said gate electrode to near said high concentration drain region as disclosed in Kuroi because it aids in increasing the lifetime of the element (For Example: See Abstract).

Additionally, since Hsing and Kuroi are both from the same field of endeavor, the purpose disclosed by Kuroi would have been recognized in the pertinent art of Hsing.

In regards to claim 2, Hsing fails to disclose the following:

a) middle concentration layer is concentration layer is formed so that the impurity concentration gradually increases from said gate electrode to said high concentration drain region.

However, Kuroi discloses a middle concentration layer is concentration layer is formed so that the impurity concentration gradually increases from said gate electrode to said high concentration drain region (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Hsing to include middle concentration layer is concentration layer is formed so that the impurity concentration gradually increases from said gate electrode to said high concentration drain region as disclosed in Kuroi because it aids in increasing the lifetime of the element (For Example: See Abstract).

Additionally, since Hsing and Kuroi are both from the same field of endeavor, the purpose disclosed by Kuroi would have been recognized in the pertinent art of Hsing.

In regards to claim 3, Hsing fails to disclose the following:

a) middle concentration layer is formed so that the impurity concentration increases step by step from said gate electrode to said high concentration drain region.

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However, Kuroi discloses a middle concentration layer is formed so that the impurity concentration increases step by step from said gate electrode to said high concentration drain region (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Hsing to include a middle concentration layer is formed so that the impurity concentration increases step by step from said gate electrode to said high concentration drain region as disclosed in Kuroi because it aids in increasing in increasing the lifetime of the element (For Example: See Abstract).

Additionally, since Hsing and Kuroi are both from the same field of endeavor, the purpose disclosed by Kuroi would have been recognized in the pertinent art of Hsing.

In regards to claims 5 and 6, Hsing discloses the following:

a) middle concentration layer is formed at an entire region spanning from said gate electrode to said high concentration source drain region (For Example: See Figure 3).

### ***Conclusion***

6. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: a) Kwon et al. (U.S. Patent No. 5,578,514) discloses a gate field effect transistor.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

July 24, 2003

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800